

throughout the universe, because it is based on invariant aqueous carbon chemistry—primarily the universal reduction potentials of carbon groups.

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#### ASTROPHYSICS

## The Nearby Stars (NStars) Project

**Dana E. Backman**

NStars is a project based at Ames to produce a comprehensive Web-accessible database on stars closer than 80 light years to Earth and to promote further observations of those stars by the astronomical community. This effort supports present and future NASA Origins missions such as the Space Infrared Telescope Facility (SIRTF), Stratospheric Observatory for Infrared Astronomy (SOFIA), and the Terrestrial Planet Finder (TPF). For example, TPF is planned as an array of infrared space telescopes capable of detecting Earth-like planets orbiting our nearest neighbor stars. This task is so technically difficult that TPF will not be able to survey all stars within its distance range during a reasonable mission lifetime. NStars is intended to help select a subset of target stars for TPF that have the best chance of harboring an Earth-like planet.

During FY99, a preliminary version of the database was demonstrated to participants in a special Ames workshop on nearby stars. Capabilities to help users examine data over the Web and define subset lists of interesting stars for further investigation were demonstrated. A substantial number of comments from the researchers attending the workshop were collected for further improvement of the database and its user interfaces.

The Nearby Stars workshop was held over three days in June 1999, organized and hosted by the NStars project scientists. The format involved a small number of invited speakers plus poster presentations. The invited talks addressed major topics in astrophysical research on nearby stars. The invited talks,

posters, and notes from discussion sessions will be published as a NASA conference publication in 2000.

NStars project scientist Dana Backman addressed the SIRTF Science Working Group in March 1999 about the NStars project and its support for definition of SIRTF observing programs. Backman also gave a talk at the SOFIA Star Formation workshop in Santa Cruz, California, in July 1999 on possible SOFIA key projects investigating nearby stars.

Five undergraduate students (Avi Mandell, Aaron Burgman, Emma Roberts, Mike Connelley, and Pete Nothstein) worked as research assistants during 1999 on projects connected to NStars. Their projects included: (a) comparison of techniques for determining ages of stars; (b) surveys for variability of solar-type stars using a robotic telescope; and (c) compilation of archived astronomical data to prepare for SIRTF observing programs. Software, database, and Web page development for NStars involved part-time employment of Symtech personnel Sarah West, Eric Vacin, Mick Storm, and Peter Mariani.

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## Observations of Extrasolar Planets

**Tim Castellano**

In the last several years, more than 30 planets have been discovered orbiting other stars. All discoveries to date have been by the radial velocity method whereby extremely small variations in the speed of the star relative to Earth are used to infer the presence of an unseen orbiting companion. More than 20% of the planets discovered orbit their parent stars for periods of less than a week. For these short-period orbits, 10% will be oriented such that the planet will periodically pass in front of the star as seen from Earth. An alternate method of detecting extrasolar planets employing high-precision measurements of the brightness of the stars can confirm the existence of the planet and obtain its mass and radius. This technique was convincingly demonstrated when the